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EFFICIENCY OF THE ENERGY AUDIT AT ENTERPRISES OF THE LOCOMOTIVE INDUSTRY

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To ensure competitiveness in new conditions, the main task of the development of the railway industry is the gradual development of modern organizational and management technologies that are widely used in industrialized countries [1, 2].

The energy sector on railways is one of the most important and integral components of the economic complex of Ukraine. At the same time, energy security is one of the most vulnerable links of the state's national security. Increasing the energy efficiency of any enterprise, reducing the level of energy consumption while maintaining production volumes, reducing the negative impact on the environment requires making appropriate decisions regarding the strategy of using various resources. This is based on energy audit and energy management [3, 4].

From a scientific point of view, an energy audit (energy survey) is a technical inspection of energy consumption at a facility with the aim of determining possible energy savings and providing assistance in its implementation through the implementation of energy efficiency and energy management mechanisms [5].

The main purpose of the energy survey is:

- obtaining data on the amount of energy resources used;
- determination of energy efficiency indicators;
- determination of energy saving potential and improvement of energy efficiency;
- development of a list of typical, publicly available energy saving and energy efficiency improvement measures and their cost assessment.

In Fig. 1 shows the structure of the energy audit, which includes four main stages. At the first stage, familiarization with the object and its main technological processes takes place. At the second stage, a map (energy passport) of energy consumption at the facility is drawn up, that is, information on energy consumption by individual processes and equipment is collected, energy saving opportunities are determined, current data is compared with nominal data. At the third stage, an assessment of the economic benefits from the implementation of various possible energy-saving measures is carried out, the selection of an energy-saving program, and the preparation of technical and economic data. At the fourth stage, the implementation of the energy saving program and the launch of the energy management system are carried out.

For electric rolling stock, an energy audit means determining the efficiency of the use of fuel and energy resources and developing recommendations for their

improvement. The engineering and technical personnel servicing the traction rolling stock should be interested in conducting an energy audit, as this will reduce the consumption of energy resources. That is, the energy audit and its separate stages (conclusions) are an integral part of the energy saving process.

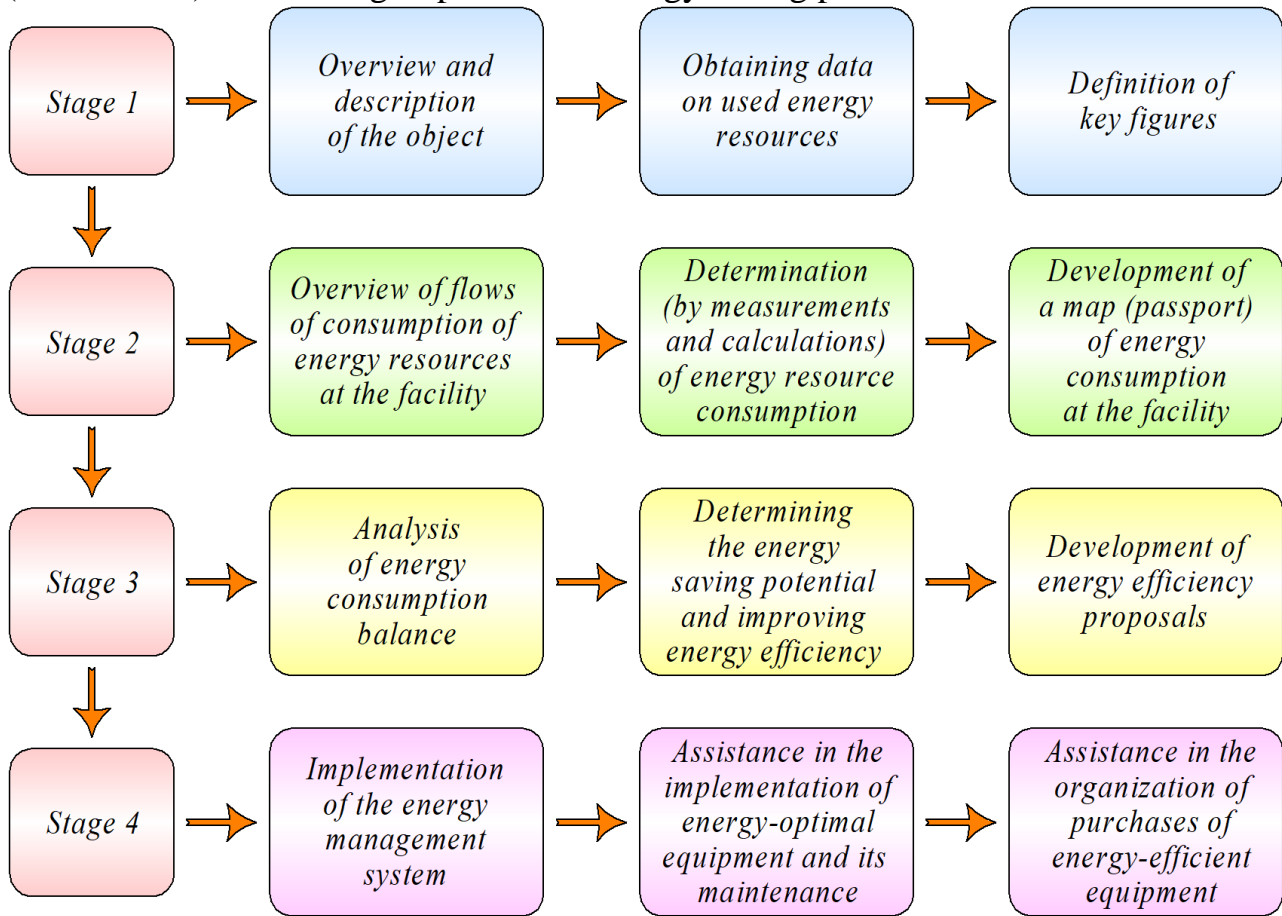


Fig. 1. The structure of the energy audit

Effective use of energy-saving technical means on traction rolling stock due to the use of innovative solutions and technologies will reduce costs and increase the traction and energy efficiency of the transportation process.

The current state of Ukraine's railways requires work on the modernization of electric rolling stock, optimization of freight and passenger train schedules, increasing the level of application of regenerative braking, and reducing unproductive specific energy consumption for train traction.

The further functioning of railway transport should be inextricably linked with a gradual reduction in energy intensity and an increase in labor productivity, which will, accordingly, lead to a decrease in operating costs related to the fuel and energy component, as well as a significant reduction in the impact of the transport industry on the environment.

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ВИЗНАЧЕННЯ ПАРКУ РУХОМОГО СКЛАДУ ДЛЯ ВИКОНАННЯ ПЕРЕВЕЗЕНЬ НА ПРОМИСЛОВОМУ ЗАЛІЗНИЧНОМУ ТРАНСПОРТІ

DETERMINATION OF THE ROLLING STOCK PARK FOR TRANSPORTATION ON INDUSTRIAL RAIL TRANSPORT

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Розрахунок парку вагонів та локомотивів, необхідного для виконання заданого об'єму перевезень, є одним з основних видів розрахунків, що виконується проектувальниками та технологами залізничного транспорту.

Метод аналітичного розрахунку парку вагонів був запропонований в 1878 інженером Кульжинским. Цей метод ґрунтується на зв'язку між роботою U , оборотом вагона q та потрібним парком вагонів N

$$N = [U\theta], \quad (1)$$

де $[\]$ - операція здобуття більшого цілого числа.

Метод інженера Кульжинского в різних його інтерпретаціях широко використовується в роботі магістрального та промислового залізничного транспорту і до теперішнього часу. Перевагою застосування виразу (1) є його простота, а також простота отримання статистичних чи розрахункових даних для проведення обчислень. Недолік методу пов'язаний з тим, що він не враховує цілочисельний характер задачі. Особливо гостро ця проблема проявляється при розрахунку парку рухомого складу промислових підприємств. Об'єктивними умовами роботи залізничного транспорту на підприємствах є неможливість поділу комплексу операцій на частини; поділ доби на зміни, при цьому, при цьому зміни бригад повинні відбуватися лише в чітко встановлених місцях; необхідність виконання огляду, екіпірування та технічного обслуговування рухомого складу, при чому в багатьох випадках